WHAT IS CLAIMED IS:

1. A method for modifying a surface of a container made of a polymeric compound containing carbon, comprising steps of:

implanting ions into said container so as to modify a surface layer of said container into a material that is not permeable by carbon dioxide gas and oxygen or a material that is hard to be permeated by carbon dioxide gas and oxygen.

2. A method for modifying a surface of a container made of a polymeric compound according to claim 1, further comprising steps of:

generating plasma in an inside of said container;

subsequently applying high-voltage pulses to an electrode disposed inside said container to thereby implant ions into said surface layer of said container.

3. A method for modifying a surface of a container made of a polymeric compound according to claim 2, wherein said high-voltage pulses applied to said electrode are positive.

4. A method for modifying a surface of a container made of a polymeric compound according to claim 1, wherein said container made of a polymeric compound is one of a container made of polyethylene terephthalate and a container made of

synthetic resin.

5. An apparatus for modifying a surface of a container made of a polymeric compound comprising:

a reception chamber adapted for receiving said container while keeping airtightness;

a vacuum pump for evacuating said reception chamber;

a plasma generating unit for generating plasma in said reception chamber;

an electrode adapted for being inserted into said container received in said reception chamber; and

a high voltage power source for applying high voltage pulses to said electrode;

wherein an interior side surface layer of said container received in said reception chamber is modified into a material that is not permeable by carbon dioxide gas and oxygen or a material that is hard to be permeated by carbon dioxide gas and oxygen.

6. An apparatus for modifying a surface of a container made of a polymeric compound according to claim 5, further comprising a magnetic field generating unit for generating a magnetic field in said reception chamber.

7. An apparatus for modifying a surface of a container

made of a polymeric compound according to claim 6, further comprising a gas supply source for supplying gas into said reception chamber.

8. An apparatus for modifying a surface of a container made of a polymeric compound according to claim 6, said plasma generating unit including:

a coil provided in an inner circumferential portion of said reception chamber; and

a high frequency power source for applying a high frequency current to said coil through a matching circuit.

9. An apparatus for modifying a surface of a container made of a polymeric compound according to claim 6, said plasma generating unit including:

a magnetron for supplying a microwave into said reception chamber through a waveguide.

10. An apparatus for modifying a surface of a container made of a polymeric compound according to claim 6, wherein said high voltage power source also serves as said plasma generating unit.

11. An apparatus for modifying a surface of a container made of a polymeric compound according to claim 6, wherein said

magnetic generating unit includes one of a solenoid coil provided to surround said reception chamber and a plurality of permanent magnets disposed to surround said reception chamber.

12. An apparatus for modifying a surface of a container made of a polymeric compound according to claim 5, wherein said high voltage power source applies positive high voltage pulses to said electrode.

13. An apparatus for modifying a surface of a container made of a polymeric compound according to claim 5, wherein said container made of a polymeric compound is one of a container made of polyethylene terephthalate and a container made of synthetic resin.